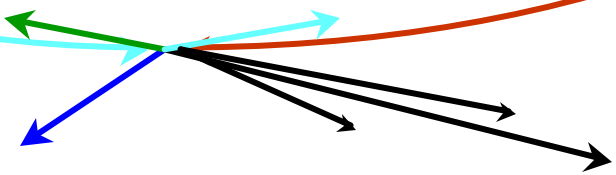
Status of the DØ Physics Effort

Boaz Klima

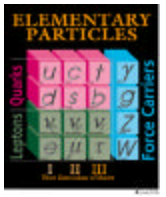
Fermilab

Collaboration Meeting

Sept. 14, 2001



Thanks, disclaimer, WWW etc



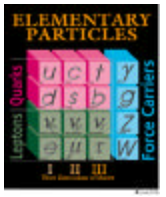
- Thanks to all convenors & chairs for their work and help in assembling this talk
- All mistakes are mine!
- More info, being updated on a regular basis, can be found linked from each group/board web page(s) – all linked from the Physics page at

  http://www-d0.fnal.gov/Run2Physics/home.html
- This talk is linked from the same page, or go directly to

http://www-d0.fnal.gov/Run2Physics/d0_private/talks/Collaboration_Meeting_091401.pdf

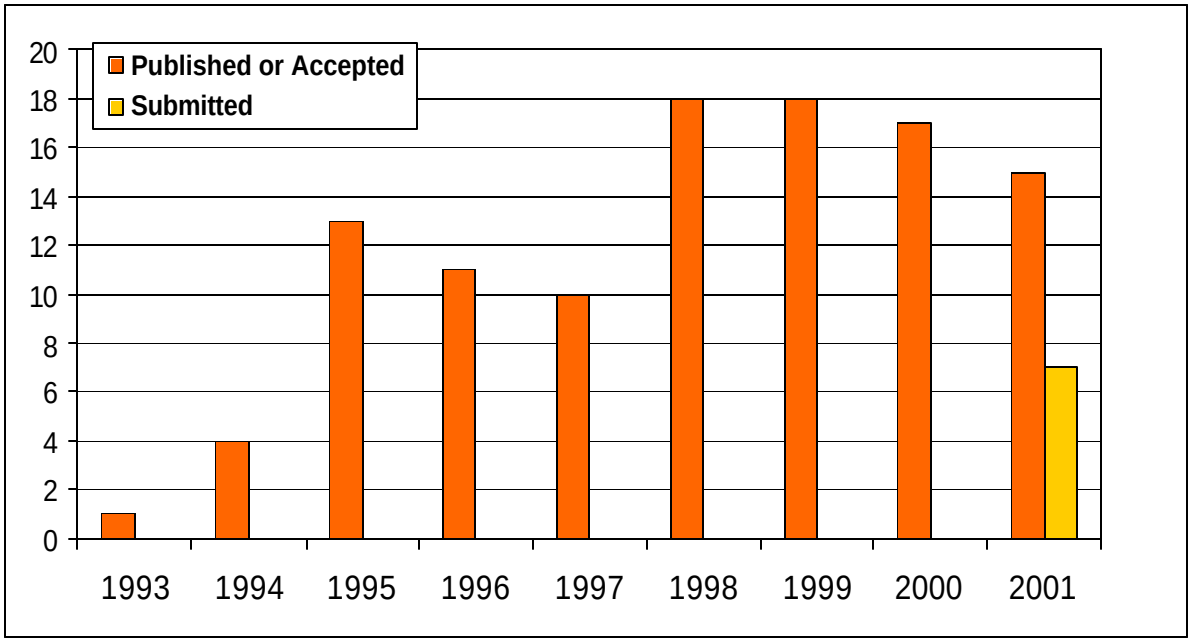
- For many interesting recent results/plots see
  - Summary of the Data Jamboree – J. Hays
  - RECO Status: Goals, schedule & Effort - H.Melanson

Run 1 as productive as ever

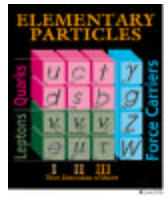


Jianming's Report

- DØ has published (or submitted) 113 papers so far
- 3-4 were submitted since the last collaboration meeting
- ~12 more papers are expected to be submitted (in 2001?)



DØ Physics Plan



- Long Term

Healthy program for many years

- Short Term

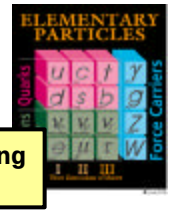
Moriond (followed by Summer 2002 conf's)

Spokesmen
H. Weerts
J. Womersley

Advisory Council
Chair: J. Hobbs

Institutional Board
Chair: S. Hagopian

Speakers Bureau
Chair: D. Hedin



Technical Manager
J. Kotcher

Physics Coordinator
B. Klima

Software and Computing
K.W. Merritt, A. Boehnlein

Run 2B Project
(J. Kotcher, Proj. Mgr.)
R. Partridge (Deputy)
M. Johnson (Tech. Coord.)
Project Office
W. Freeman

Silicon
M. Demarteau
A. Bean (Deputy)

Level 1
H. Evans
D. Wood

Level 2
R. Hirosky
J. Linnemann

Level 3
G. Blazey
P. Padley

Online
S. Fuess
P.Slattery

Installation & Infrastructure
(J. Kotcher)

Operations
Run Coordinator: D. Denisov

Detector Commissioning
M. Begel, L. Groer
Electrical Operations: R. Hance
Mechanical Operations:
R. Rucinski

SMT E. Kajfasz, P.Rapidis

CFT D. Lincoln

CPS D. Alton

FPS S. Chopra, A. Patwa

Calorimeter
U. Bassler, N. Parua

ICD A. Stone, A. White

Cen Muon T. Diehl

Fwd Muon (D. Denisov)

Solenoid R. Smith

FPD
A. Brandt

Lum Mon
G. Guerkov, R. Partridge

DAQ
S.Mattingly

Online
S. Fuess, P. Slattery

Trigger
G. Blazey, N. Varelas

Triggermeisters
L. Babukhadia, E Gallas

Trigger Simulation
D. O'Neil, S. Protopopescu

Trigger Board
Chairs: D. Wood, L. Groer

Offline Resources Board
Chair: N. Hadley

B Physics
B. Abbott
H. Evans

Higgs
J. Hobbs
M. Narain

New Phenomena
L. Duflot
G. Landsberg

QCD
J. Krane
M. Zielinski

Top
E. Barberis
C. Gerber

WZ
T. Diehl
G. Steinbrueck

EM ID
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M. Jaffré

Muon ID
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D. Zieminska

Jet/ME_T ID
G. Bernardi
V. Zutshi

Tau ID
D. Chakraborty
Y. Gerstein

b ID
F. Filthaut
R. Van Kooten

Luminosity
M. Begel
J. Hauptman

Jet Energy Scale
A. Goussiou
R. Kehoe

Fwd. Proton
G. Alves
M. Martens

Reco program integration

Algorithms
H. Melanson

SMT
Y. Kulik

CFT
M. Hildreth

Global Tracking
V. Kuznetsov
H. Greenlee

Vertexing
G. Lima, S. Choi

Calorimeter/PS
L. Sawyer
A Turcot

Muon system
C. Royon, L. Stutte

Unpacking
(C. Leggett)

Calibration/ Alignment
G. Gutierrez
T. Yasuda

Level 3 filtering
M. Souza
D. Claes

Infrastructure
A. Jonckheere, TBA

Online
S. Fuess
P. Slattery

Global Systems and Production
M. Diesburg, I. Bertram, TBA

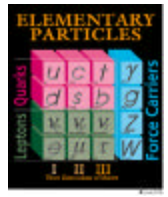
Data Access and Databases
L. Lueking, V. White

Simulation
Q. Li, S. Protopopescu

Event Generators
(S. Protopopescu)

D0gstar
S. Kunori

Fast simulation
S. Eno



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J. Womersley

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Jet Energy Scale
A. Goussiou
R. Kehoe

Fwd. Proton
G. Alves
M. Martens

Integration of Reconstruction program and Level 3 filters together with Algorithms groups

Associate Director for Research
M. Shaevitz

Spokesmen
H. Weerts
J. Womersley

Speakers Bureau
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Offline Resources Board
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Trigger Board
Chairs: D. Wood, L. Groer

Triggermeisters
L. Babukhadia, E Gallas

CDF

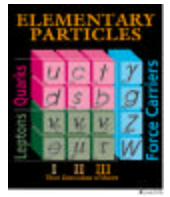
Joint CDF/DØ Tevatron Physics Working Groups

- **B Physics**
- **Higgs**
- **New Phenomena**
- **QCD**
- **Top**
- **Electroweak**

- **B Physics** — B. Abbott, H. Evans
- **Higgs** — J. Hobbs, M. Narain
- **New Phenomena** — L. Duflot, G. Landsberg
- **QCD** — J. Krane, M. Zielinski
- **Top** — E. Barberis, C. Gerber
- **WZ** — T. Diehl, G. Steinbrueck

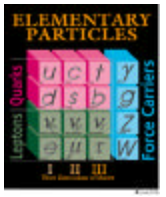
- **EM ID** — V. Buescher, M. Jaffré
- **Muon ID** — J. Butler, D. Zieminska
- **Jet / ME_T ID** — G. Bernardi, V. Zutshi
- **Tau ID** — D. Chakraborty, Y. Gerstein
- **b ID** — F. Filthaut, R. Van Kooten
- **Luminosity** — M. Begel, J. Hauptman
- **Jet Energy Scale** — A. Goussiou, R. Kehoe
- **Fwd. Proton** — G. Alves, M. Martens

Integration of Reconstruction program and Level 3 filters together with Algorithms groups



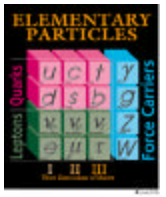
Boards

Trigger Board (TB)



- Education & Techniques
  - Trigsim (Dugan O'Niel)
  - Selecting/examining trigger terms offline (Suyong Choi)
  - Trigger Database (Elizabeth Gallas)
- Presentations of studies of triggered data
  - Forward muons (Rob McCrosky)
  - Level 1 Hadronic veto (Bob Kehoe, Ia Iashvili)
  - Central muons (Tom Diehl)
  - L3 filtered EM objects (Volker Buecher)
- Policy and planning
  - Trigger naming convention
  - Running level 3 filters (currently under discussion)
  - Future full-capability trigger list (upcoming discussions)
  - Target event writing rate until shutdown: 12-20 Hz

Trigger Board (cont.)



- Approved new global trigger list (running since 9-6-01)

Global-CalMuon-1.0

which includes several triggers which run unprescaled at all luminosities

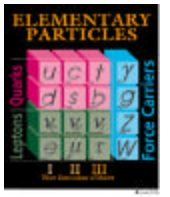
  - single EM trigger (20 GeV)
  - Di-EM triggers
  - Di-Muon trigger (forward; central “in the works”)
  - Muon+jet trigger (central)
  - High-pt Jet trigger

And L3 filtering on lowest L1 ET jet and EM (5GeV)

See the trigger board web page for minutes of all meetings and useful trigger-related links

The TB wants more feedback; are triggers getting us the events we need for commissioning and physics tune-up?

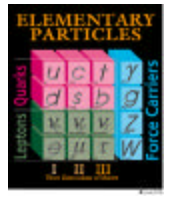
Offline Resources Board (ORB)



- Charge: Allocate Offline Computing Resources
  - Priorities for MC generation on Offsite Farms
  - Priorities for Processing on Fnal Production Farm
  - Priorities for batch queues on D0mino
  - Priorities for Project Disk Allocation
  - Priorities for SAM storage and data retrieval
  - Priorities for Linux Analysis Clusters
  - Etc…
- **Please send requests in these areas to the ORB**
- Members
  - Nick Hadley (chair), Iain Bertram, Mike Diesburg, Uli Heintz, Lee Lueking, Roger Moore, Thomas Nunnemann, Sherry Towers,

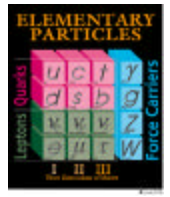
  + Physics group reps: B Physics - Bill Lee, Higgs - Neeti Parashar, New Phenomena - Andy White, QCD - Iain Bertram, Top - Dhiman Chakraborty, WZ - Andrew Askew
  + (ex officio) Boaz Klima, Amber Boehnlein, Wyatt Merritt

ORB - Recent Activities



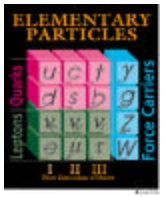
- Survey of Available resources
  - See ORB web page and meeting minutes
    http://www-d0.fnal.gov/Run2Physics/orb/d0_private/orb_home.html
- D0mino Disk Plan approved!
  - Although cost of disk has dropped, disk space is still limited
  - Two stages
    - First Stage – all Physics, ID, Detector groups get some additional disk
    - Second Stage – ORB carefully considers requests from Physics, ID, Detector and other groups and allocates remaining disk
  - The version of the disk plan as approved by the ORB can be found in

    http://www-d0.fnal.gov/Run2Physics/orb/d0_private/talks/disks.plan2
- Plan for User disk purchases in progress



Id Groups

Luminosity Id

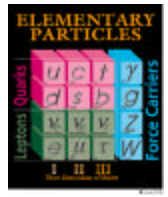


- **Short term plans**
  - **Sept. 15, 2001 -** provide approximate delivered luminosity (and error) for every run and/or store in an automated way and in a timely fashion. This info should be easily accessible to the collaboration. We imagine this would use the information currently sent to ACNET
  - **Nov. 1, 2001 -** provide a tool for users to get approximate live luminosity (and error) for a given trigger in a given run (or run range)

- Work done so far on detector hardware and software, monitoring and online tools
- There is a clear need for manpower to help in doing offline work (mainly database related) and providing user-friendly tools

Volunteers?

Forward Proton ID



Monte Carlo and GEANT Status

FPDDigi:

- Digitization package already in CVS
- Changing access methods for the FPDDigiChunk; soon in CVS

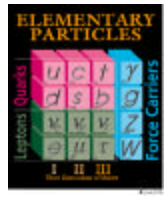
FPD GEANT:

- Particle from IP with (p, ?) → reconstruct fiber hits
- Fiber hits → reconstruct (p, ?)
- GEANT/DØgstar modifications to double precision
- Modifications completed and tested

MCPP:

- 4 new packages with the event generators:
  (POMPYT, PHOJET, POMWIG and SCIGAL)
- Packages are already available in CVS

Forward Proton ID - L1 and L3



L1 Trigger Equations

Starting to simulate equations through Xilinx s; first FPGA's by November

Unpacker for AFE boards

Preliminary version available

Track Reconstruction

Multi-hit and vertex displacement correction; test release in few weeks

L3Unpack Tool

Preliminary version available; next step depends on the calibration tool

Tracking Tool

Fast implementation of the offline tracking

Improvements in ghost tracks rejection

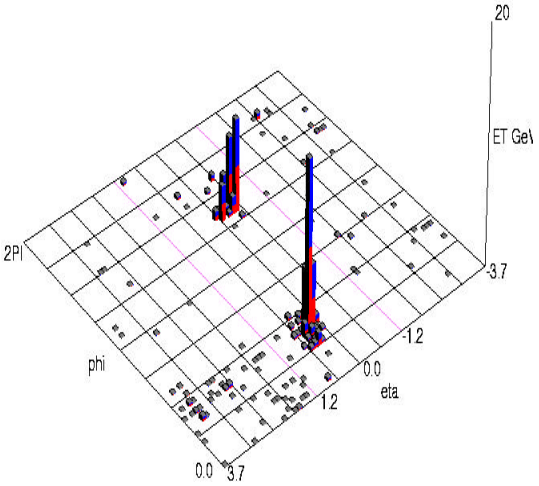
Single Interaction Tool

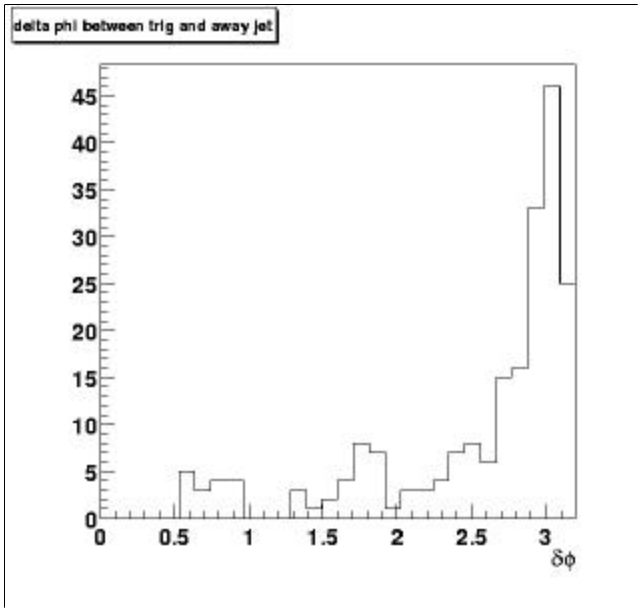
Vertex information implemented and in CVS

Including Calorimeter information

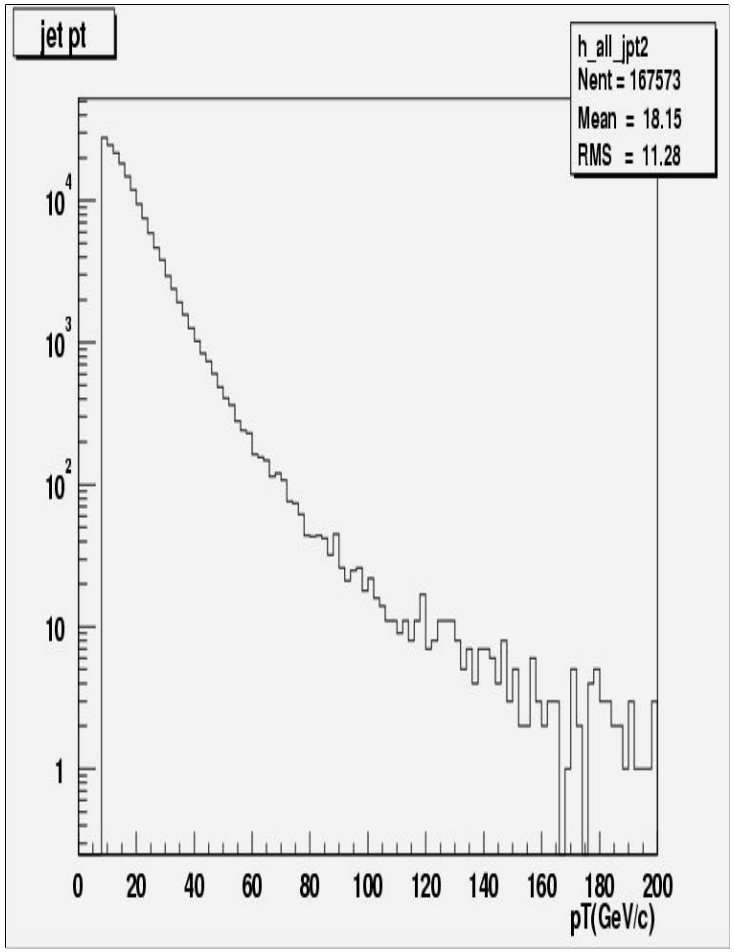
Release for p11 (15 / October)

Jets and $\not{E}_T$ ID

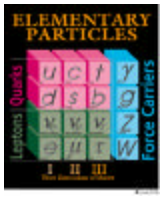




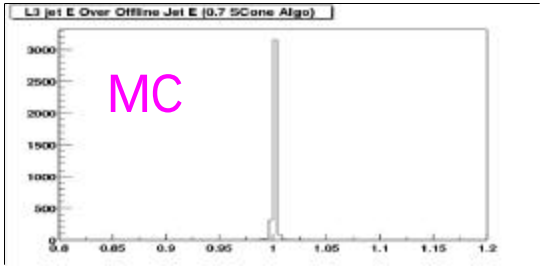
Run 2 Data

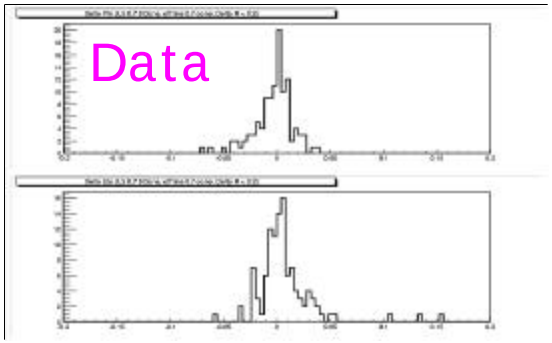


Jets and $\not\!\!E_T$ ID - Highest Priorities

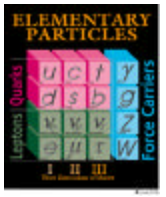


- **Level 3 Jets**
- **Level 3 and Offline MEt**
- **Hot Cell Killer**
- **Level 2 Jets**
- **Algorithmic studies**
- All in dire need of help!
- **Level 3**
  - Already running as part of L3 filtering
  - Scone and kT implemented
  - Need studies on data and MC to optimize cuts and algorithms



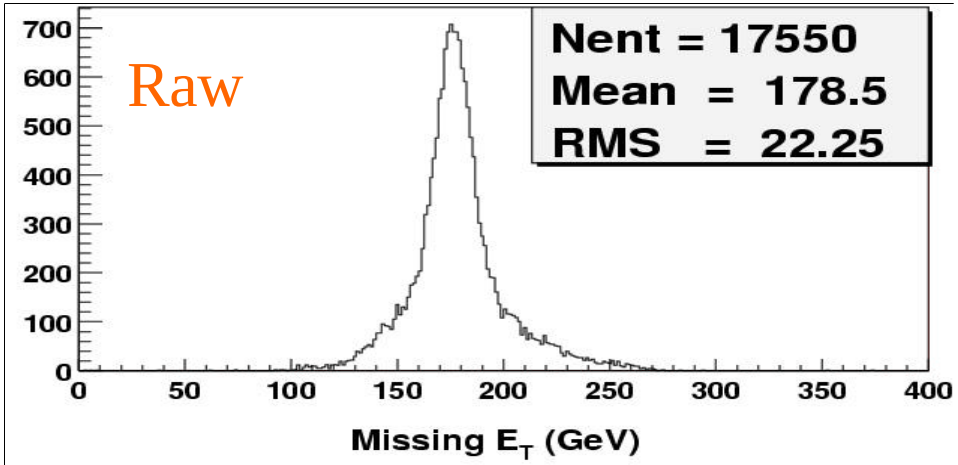


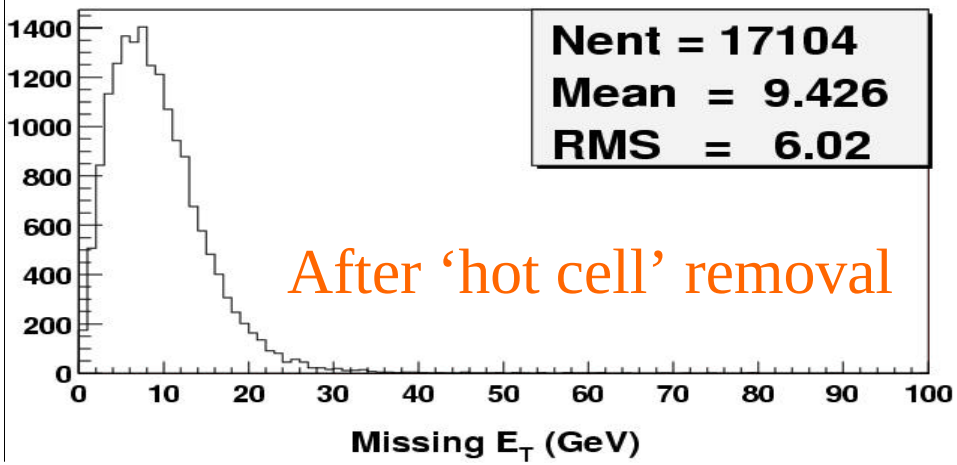
$\not{E}_T$ and Hot Cell Killer



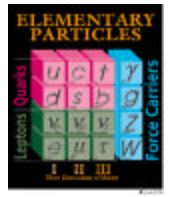
- **Missing ET**
  - Offline (cell based) and Level 3 (cell and jet based) tools exist.
  - No comprehensive data or MC studies.
  - Re-vertexing available

- **Hot Cell Killer**
  - New Anomalous Deposit Algorithm
  - Makes decision based on all neighboring cells in a cube
  - Needs to be part of reco
  - Studies on Run 2 data
  - MisId rate on MC cells with E_T>10GeV – 0(5)% for NADA(AIDA)





Jets and $\not\!\!E_T$ ID – Studies & Level 2



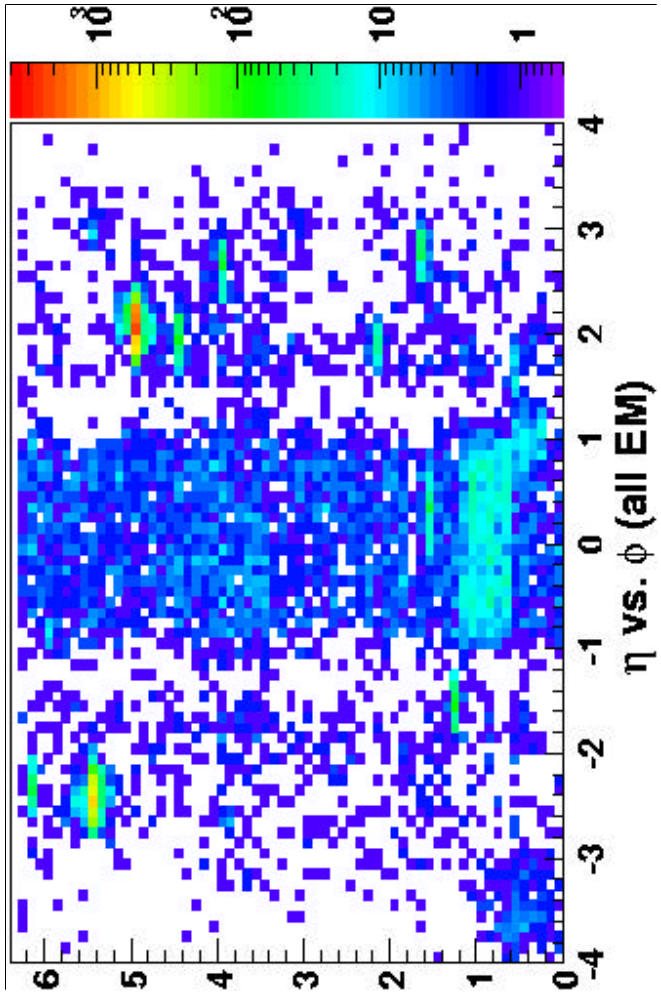
- Algorithmic Studies
  - Cone v/s kT
  - Run1 v/s Run 2
  - Lost jets
  - Jet pointing
  - Energy flow
- **Level 2**
  - 3x3 and 5x5 trigger tower window clustering available
  - Will become critical soon
  - ~10 reduction in rate (upg-geant)
  - No recent study with pileup

Help wanted!

EM ID

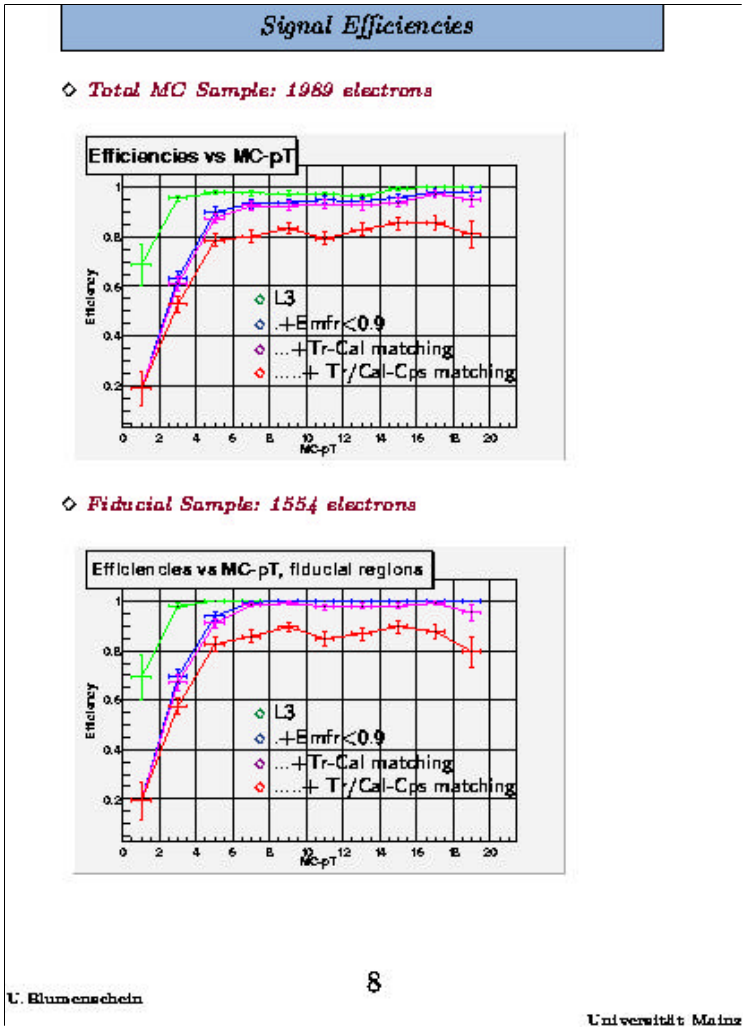
- Data Studies
  - Large # of runs analyzed in search for EM objects
  - Difficult due to “noisy” calorimeter (hot cells changing run-by-run) – work on online id in progress
- MC Studies
  - EM efficiency
  - QCD rejection

See p10 certification

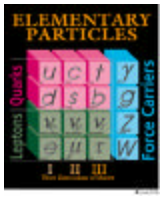


EM ID

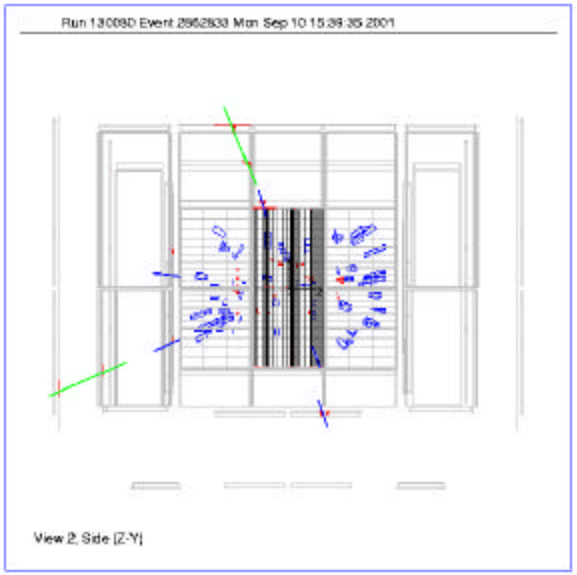
- Trigger Studies
  - L1, L2, and L3
  - Currently mainly on signal
  - Soon on large QCD samples
- Code development
  - Thumbnail
  - Fine-tuning of cpsreco
  - Fine-tuning of L3 EM
  - Update EM discriminants with Plate-MC
  - Global EM fit



Muon ID



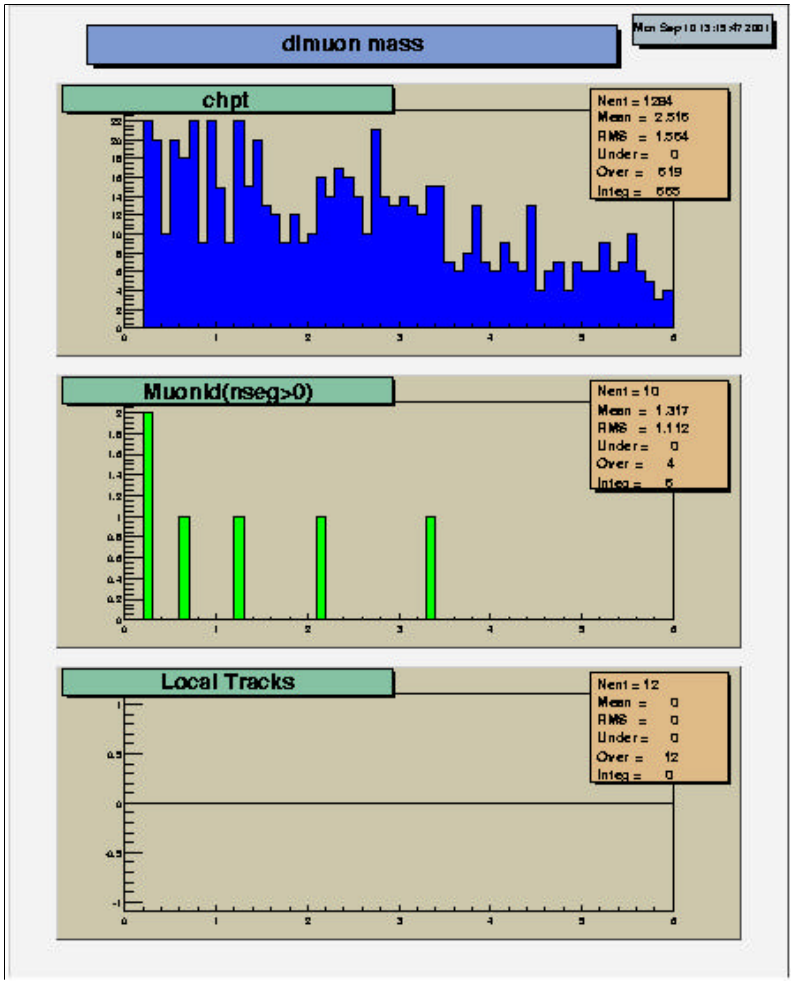
- Triggering on muon scintillator coincidences
- Successfully reconstructing triggered Famus muon tracks (since day 1) and Wamus tracks (since last week)
- Successfully matching local muon tracks with central tracks (when available…)
- d0ve display of a high pt dimuon, possibly zmumu, found in the muon system (but missed by SMT so far)



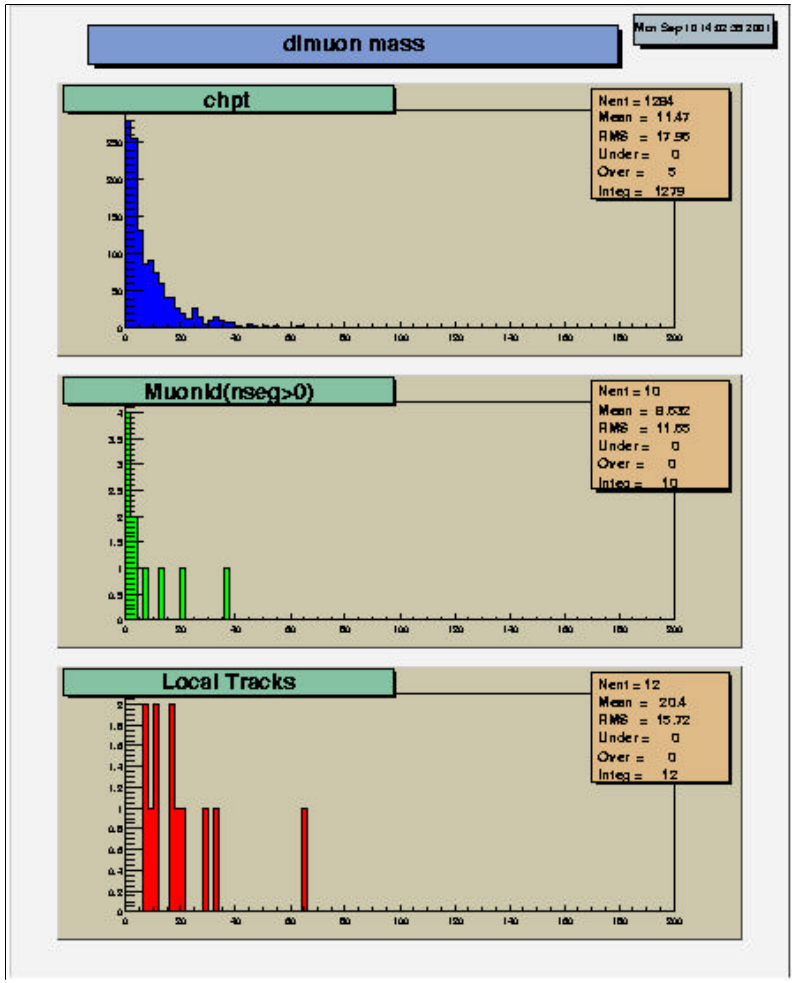
- Results - based on the runs 129* and 13019
  - Total number of events 101,619
  - mu1pix triggers 30,640
  - mu2pix triggers 3,103

Muon ID - Results

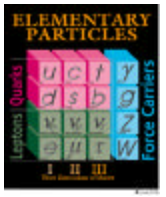
Low Mass



High Mass



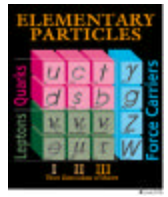
Tau ID



- Trigger
  - Level 1: heavily based on track triggers. The CFT occupancy was measured and is a little better than the simulation
  - Level 2: 1-prong and 3-prong triggering is implemented in L2CTT
  - Level 3: algorithm exists and is implemented. Now it is time to tune and optimize

Volunteers are needed to work on L1 & L2 algorithms

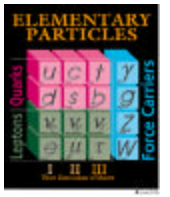
Tau ID



- Offline
  - Calorimeter and track seeded candidate finding
  - Tau final states are separated into three types: $h\nu$, $h+n\cdot\pi^0\nu$ and $3h+X$
- "Typical" efficiency/rejection for MC

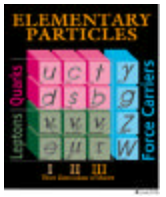
  40% at 1% fake rate
- Major efforts at the moment
  - Level 3 optimization
  - Multivariate studies on MC
  - Simple square cut optimization for early analyses
  - Data monitoring

B-Quark ID



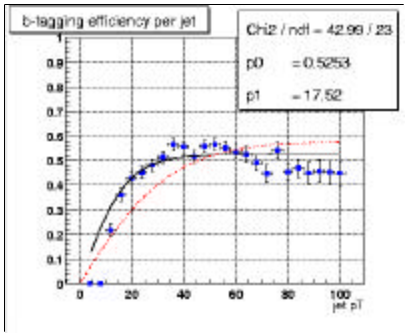
- Tagging algorithms have been further developed and are fairly mature/stable (p10)
- Will be ramping up comparing data/MC (muon/dimuon triggers, study opposite-side b's) and optimizing in response to the data
- Taggers: (optimization so far mostly with high-pT samples):
  - **Muon Tagger**
    - @ high p_t^rel, including DCA
    - neural net muon tag
  - **Electron Tagger**
    - @ high p_t^rel, semreco + road method (into EC soon)
    - CPS info available to increase purity
  - **Impact Parameter Tagger**
    - "decay length" of each track in a jet, probabilities combined to form single discriminant for jet
    - access to KSU "forward multiplicity" parameters
    - starting look at 3-D impact parameters
  - **Secondary Vertex Tagger**
    - continuous improvements both in PV and SV
    - Kalman filter as default (see vertexing report)

B-Quark ID



- Combinations
  - Likelihood Tagger - more variables
  - Neural Net - new framework/interface (inc. to d0MA), first weights files installed

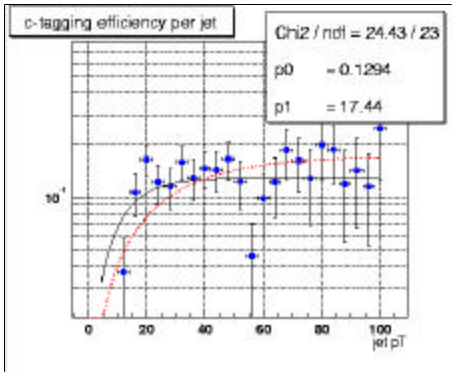
Need feedback from Physics Groups



b

- Immediate plans (for RECO p11 release)
  - L3 functionality
  - integrated test
  - Thumbnail
  - separate B-physics and high-pT RCPs fill framework with flavor tag

And, yes, volunteers are welcome



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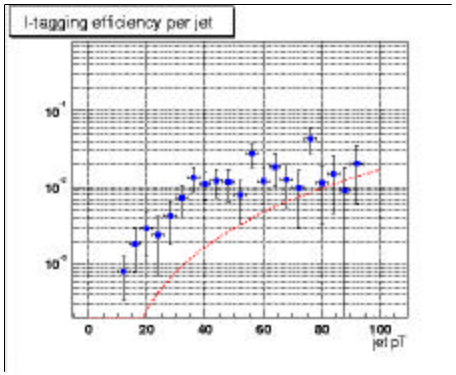
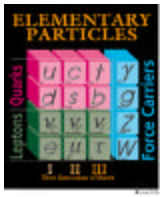


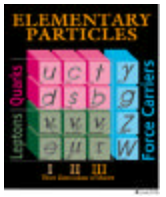
uds

Jet Energy Scale (JES)



- Objectives
  - Jet energy scale
  - Jet/Dijet energy/mass resolutions
  - B-jet scale/resolution
  - Monte Carlo jet scale/resolution
- Plans
  - Moriond
    - Very preliminary correction (large errors) including: energy-dependent response, showering correction for cone, underlying event, noise, muon/neutrino for b-jets, and parton-level correction
  - Summer 2002
    - Well-known correction from Run 1 method
    - Preliminary energy scale from tracks and $Z \rightarrow b\bar{b}$

Jet Energy Scale (JES)

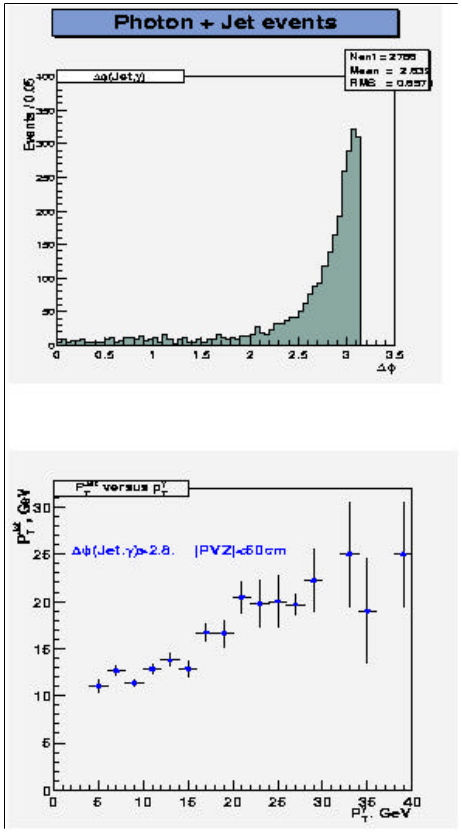


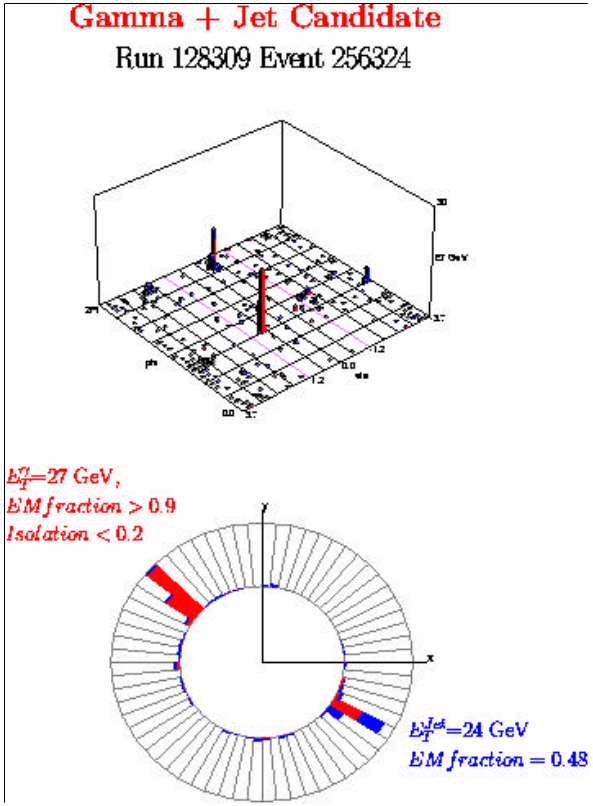
- Projects
  - Response from photon+jet
  - Response from Z+jet
  - Showering correction
  - Showering profiles in MC vs Data
  - Offset energy
  - Eta-dependence of response in ICR
  - Global PT fit in photon+jet
  - CellNN/Eflow algorithm calibration
  - $Z \rightarrow b\bar{b}$
  - E/p with t
  - Resolutions
  - Correction package

- Projects that need help
  - m/n correction for b-jets
  - Parton level correction
  - Topology, K_T etc biases
  - Background studies for response
  - Punch through study for response

Volunteers are welcome

JES – Preliminary Results



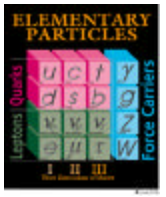


γ and jet are back-to-back

Reasonable response

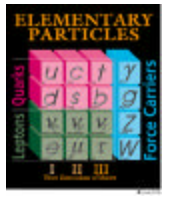
γ+jet candidate event

(display works!)



Physics Groups

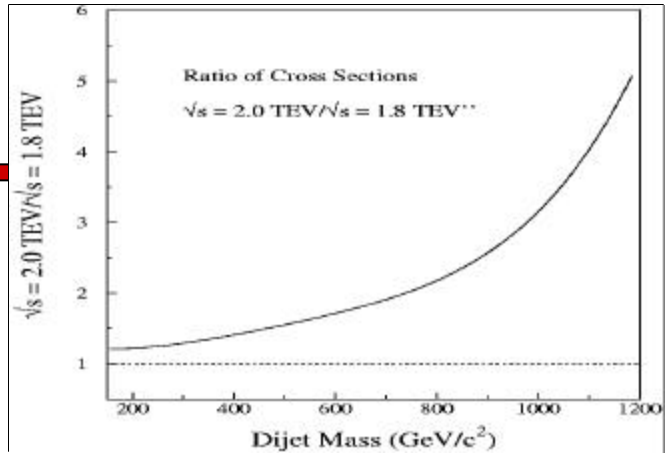
Physics Groups - membership

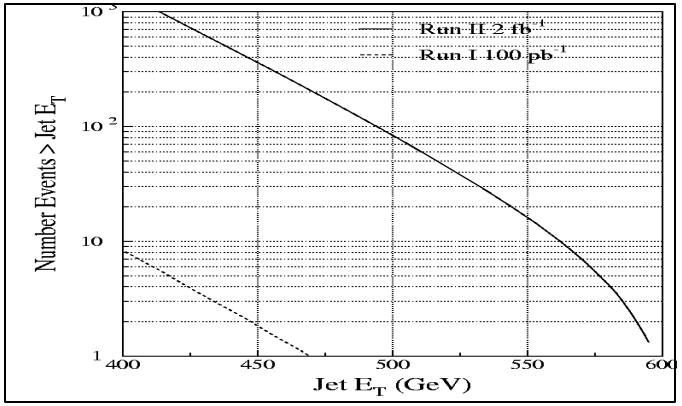


- Based on the mailing distribution lists*
  (on the Fermilab LISTSERV as of Sept. 4, 2001):
  - B – 63 (in July - 62); 13 theses on list *
  - Higgs – 99 (84); 15
  - NP – 127 (113); 26
  - QCD – 49 (49); 4
  - Top – 100 (81); 24
  - WZ – 31 (28); 5
- All seem to be growing; some more than others
- 86 out of 120(?) grad-students in DØ already on the thesis list

* Disclaimers
  * mailing distribution list is not necessarily the list of active members of a physics group
  * Not all grad-students indicated (decided?) which physics topic to pursue

QCD Physics: Priorities



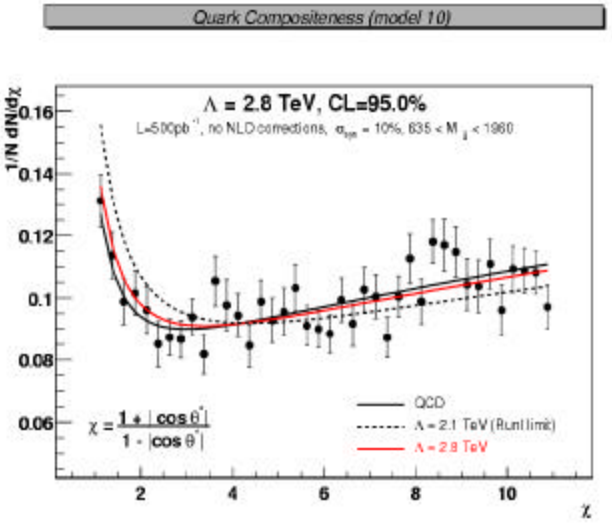


- Big opportunities for QCD in Run 2
  - Higher energy, luminosity
    - large p_T reach for jets, photons, W/Z…
  - Push limits of perturbative QCD
    - soon available at NNLO (ME and PDFs)
  - Improved detector, magnetic tracking
    - event structure, low p_T jets, photons
  - Roman pots for diffractive physics
    - FPD Motto: Anything you can do, we can do diffractively!

- Priority studies – high interest/impact

(large-x partons, deviations from QCD, compositeness)

  - High p_T jet x-section
  - Dijet angular distribution
  - Elastic, Single Diffractive (Jets, Ws), and Double Pomeron processes



QCD Physics: Plans and Dreams…

- Many interesting analyses
  - Energy flow in minimum bias and underlying event
    - impact on energy corrections and resolutions, physics with Run 2b luminosity, thinking about LHC…
  - Define our jets!
    - comparisons, optimization of jet algorithms
  - Direct photons and diphotons
    - stress-test perturbative theory, radiation effects, resummations; constrain the gluon distribution
  - Jets with tracking, event shapes
  - Check QCD web page for more!
- Working with other groups:
  - W/Z+jets, W/Z p_T
  - Higgs studies require understanding of min bias events!
  - Anyone interested in $g \rightarrow b\bar{b}$ splitting?
- Let's take the QCD program beyond the Run 1 scope:
  - We need your fresh views, past experience (HERA, LEP, fixed target…)
- **Come and make a difference!**

B Physics

Winter Conferences Goal

- Give confidence that DØ can do B Physics in Run II

Possible "Results" to Present

1. Mass Peaks
   - K_s, J/ψ
   - sine qua non
2. Fully Reconstructed Decays
   - pretty event pictures
   - as many modes as possible
   - we can see B's
3. $b \rightarrow \mu$ Cross-Section
   - we understand b-tag eff
4. J/ψ Production Rates
   - we understand J/ψ's
5. Lifetime in $B \rightarrow J/\psi X$
   - we understand vertexing

Long Term Goals

- Make sure all competitive analyses are covered

Some Key Topics

- sin 2β ($B \rightarrow J/\psi K_s$)
- Non-SM CP ($B_s \rightarrow J/\psi \phi$)
- B_s mixing
- Rare Decays ($B \rightarrow K^* l^+l^-$)
- b Production
- Λ_b Lifetime
- + many others…

Necessary Technical Analyses

- B_d mixing, Lifetimes, Tagging Studies
- + many others…

People identified for many of these

B Physics

Scrutinize the Data

- K_s found some
  - thanks Ariel & Sherry!
- J/ψ still looking
- μ + jets start effort
- use e's trigger?
- 2nd V's after break

Monte Carlo

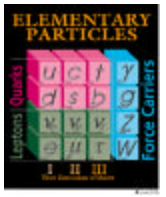
- Generator Level Cuts
  - b's (P_T, η…),decay modes, Leptons (no., P_T, η…)
  - implement these in a simple, trackable way
  - integrate into MC framework
  - developing a "selector" tool
- Bring EvtGen from BaBar
- SMT only tracking

Organizational Issues

- Integration with b-ID
  - successful b Jamboree
  - generating MC together
- Clear-cut task list
  - well-defined, short-term jobs
  - useful for people just starting
- SMT only tracking
  - important to get results for conferences
  - need to help out the tracking group here

Still lots of room for help

Electroweak (WZ)

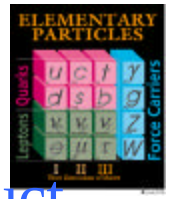


- Eschewed Monte Carlo analysis in favor of looking at the RECO results on Data
- The goal - identify all W or Z boson candidate events and collect them for object ID and physics analysis
- La Macchina - spins through the Global Run Root-tuples available through SAM (almost fully-automatic)
- The WZ run/event database is temporarily at

  www-d0.fnal.gov/Run2Physics/wz/Public/database.html

- plan to coordinate our lepton ID with the ID groups

La Macchina



Key: Input Product

All Reco'd Runs in SAM

1

Get_file_link

WZ Run & Event Database (Web-based)

"WZ_catchup" PRJ disk of Links to SAM cache

2

Event Selector

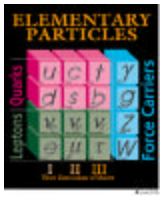
Run Text File

Update Database

3

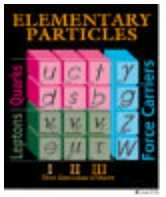
"Tapped-out" Events for analysis

Electroweak (WZ)



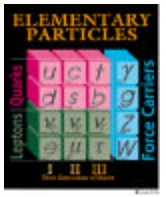
- Plan on having results in time for the early spring conferences
- Priorities are
  - cross section for W's and Z's in electrons and muons
  - W+gamma in e's and mu's (search for radiation zero)
  - Z' search in electrons
- These topics are consistent with the thesis students (5) working within the group

New Phenomena



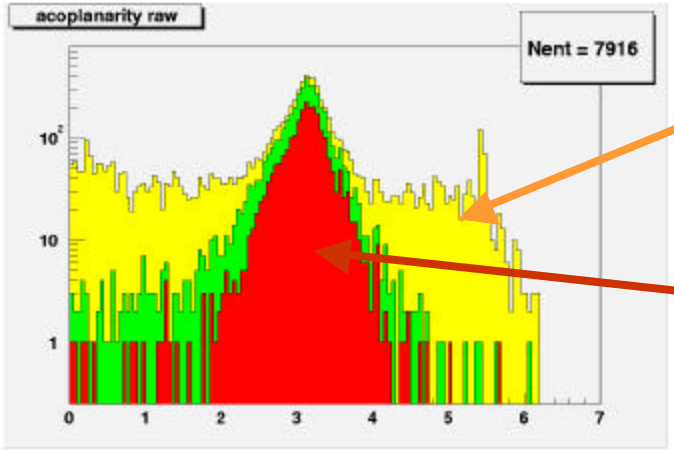
- Run I analyses
  - A number of papers under group / collaboration review (squarks, RPV(2), LQ (METjj)) and few to come
  - A good opportunity for newcomers to learn about physics at a TeV
- Run II analyses
  - Embraced the model of priority analyses for Spring/Summer 2002
    - Focus on detector understanding / algorithms / tools
  - A number of high-priority analyses; will re-evaluate depending on progress and detector status after the October shutdown:
    - Trileptons
    - eμ mET
    - γγ mET
    - RPV λ & λ'
    - 1st gen LQ eejj
    - extra dim ee, γγ

New Phenomena



- MC studies
- Studies based on data, have provided feedback
  - Calorimeter (noisy / hot cells,..)
  - EM id (efficiencies, tools, …)
  - Jet id (quality cuts, missing ET, ….)
  - Trigsim
- Not easy to find good datasets for a given study
- Need to move forward to other detectors / tools / algorithms

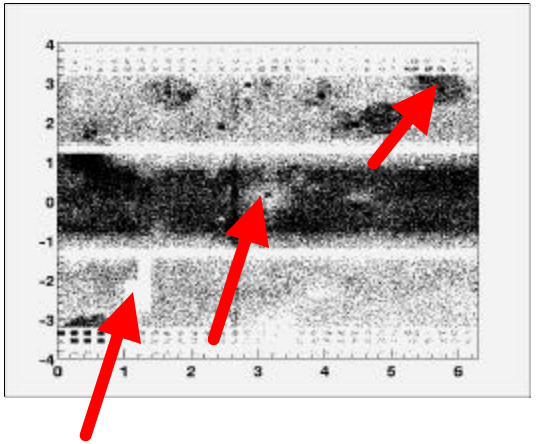
di-jet event acoplanarity



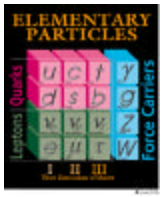
before cleaning

After cleaning

Hot / dead regions in calorimeter



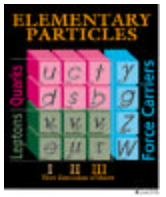
Higgs



- Taking off from where was left off in the HiT group
- See at least five natural time scales:
  a. The period between now and Spring 2002 conferences
  b. The period between Spring and Summer 2002 conferences
  c. the period between Summer 2002 and 1 fb^{-1}
  d. Between 1 and 2 {fb-1}
  e. beyond 2 fb^{-1}
- What are appropriate issues for each of these periods?

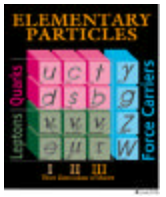
  Need to consider the full object/physics matrix

Higgs - Working Groups



- Initially 3 groups
  - Group A: high-pT charged lepton group
    - including single-lepton+jet final states, multi-lepton+jet final states and photon+jet final states
  - Group B: jet group
    - including jets+MET final states and all jets final states
  - Group C: jj mass and b tagging for higgs studies.
- Structure in response to available manpower, trying to insure that there is a critical mass in all final states, and that no analysis is orphaned.
- Common basic selections are a clear goal
  - Both offline and trigger level
    - start with object ID groups' definitions
    - are these right for us? Searches are different than precision measurement. If not, must feed back into object ID groups
- No choice is perfect; will be cross group issues

Higgs - Goals for Spring '02



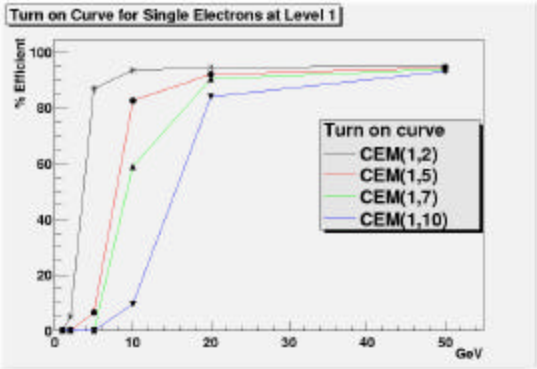
- Pick 3 basic topologies
  - W($\rightarrow l\nu$)+jets
  - Z($\rightarrow ll$)+jets
  - Z $\rightarrow$bb
- What will they have?
  - First pass trigger efficiencies (?)
  - Basic selections with event distributions overlaid with Monte Carlo
  - Both tagged and untagged samples
  - Event rate comparisons? Physics cross sections?

Top

Work ongoing in the general areas of :

- **cross section**
- **mass**
- **triggers for top**
- **single top**
- **properties**

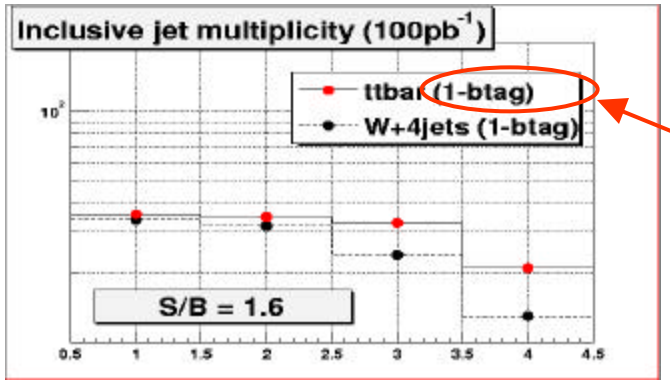
- **What is being done:**
  - **MC studies for analyses feasibility& preparation and for trigger studies (L1Cal/L2GBL, L1Muo,..)**
  - **Determine MC/Data needs for evaluation of systematics (jet energy corr./b-tag)**



- **What we are starting to do:**
  - **Look at data to: understand the detector, understand triggers, jet corrections,…**
  - **Efficiency studies performed on MC electron, ttbar, and QCD samples**
  - **Working to run trigsim on actual data and to produce data efficiencies**

Top – Studies and Results

1st plot we would like to produce on l+jets, with any selection



pair production cross-section

so far: mostly l+jets, b-tag (soon with kinematical analysis) also all-jets trigger studies

needs b-tag data analysis (efficiency, fakes) and jet corrections (work ongoing on response and resolutions)

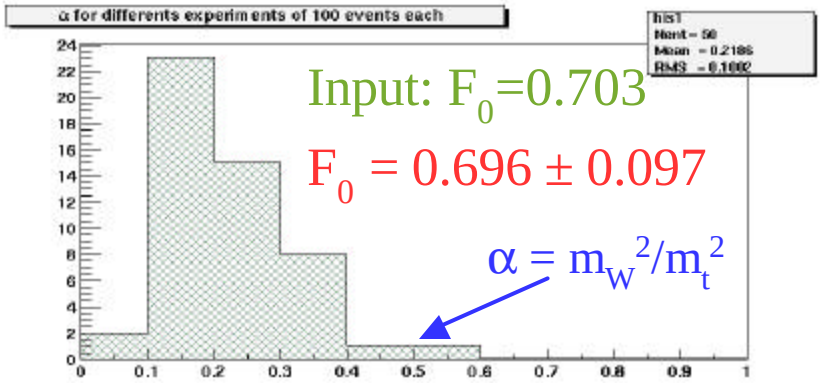
mass and properties

some advantage from doing this a second time around:

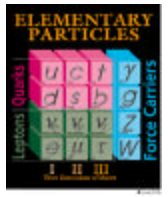
use Run I mass fitting tools (l+jets, dilepton), investigate the use of full event kinematics (Matrix Element method) for mass and properties

W's helicity in top decays

$$F_0 = \frac{1}{1+2\cdot\alpha}$$



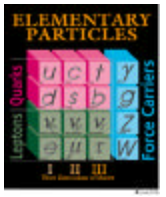
Summary - Where are we now?



- Still lots to do before we get to Physics
  - Complete the detector + trigger system
  - Understand what it does – Commissioning/Integration
  - Calibrate, align, develop algorithms (L3&Offline)
  - Everything else that nobody wants to talk about…

- However, a lot has already been accomplished
  - We see Ks, muons, jets, electrons, γ's, W's, Z's, J/ψ's, …
  - We already inserted physics-related (non-pure commissioning-related) triggers in the trigger list
  - Algorithm/Id groups work both on Data and MC
  - Physics groups gearing up for (long and) short-term challenges

Conclusions



- Exciting times ahead of us
- Much has already been accomplished
- Still lots to do before we get to Physics
- We should all work together in a very coherent and focused way
- If you haven't done so, get involved ASAP

Let's get ready to produce first Physics results in 2002!